

. claims

1. A navigation apparatus characterized by said navigation apparatus comprising:

5 a departure point data acquisition device (123) which obtains departure point data including at least location data of a departure point from which a mobile unit departs;

a registration device (106, 108) which registers a destination to be reached by the mobile unit;

10 a spot data acquisition device (121) which obtains spot data on the registered destination including at least location data indicating the location of the destination, stay length information representing information on an expected stay length at the destination and available time information
15 indicating available dates and times of the destination;

a storage device (105) which stores map data;

20 a generation device (123) which generates route data from the departure point to the destination including at least an expected arrival time at the destination on the basis of the obtained departure point data, the spot data on the registered destination and the map data; and

a route guidance device (115) which performs route guidance from the departure point to the destination on the basis of the generated route data.

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2. The navigation apparatus according to claim 1, wherein, in a case where a plurality of destinations are registered

. by said registration device;

 said generation device generates the route data on a route extending from the departure point to one destination to another in the destinations.

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3. The navigation apparatus according to claim 1, further comprising a notification device (109, 112) which notifies at least one of destination information representing information on the destination including at least the expected 10 arrival time at the destination in the route data generated by said generation device, and the generated route data.

4. The navigation apparatus according to claim 3, wherein, in a case where the destination information includes at least 15 one of a name of the registered destination, an expected departure time indicating an expected time of departure from the destination in the route data, and a stay length representing an expected stay length at the destination in the route data,

20 said notification device notifies at least one of information on the name of the destination, the expected arrival time, the expected departure time, and the stay length.

5. The navigation apparatus according to claim 4, wherein, 25 in a case where a plurality of route data are generated by said generation device, and where said notification device notifies the plurality of the generated route data,

· · · · · said navigation apparatus comprises:
· · · · · a selection device (106, 108) which selects one of the
plurality of the notified route data; and
· · · · · said route guidance device performs the route guidance
5 from the departure point to the destination on the basis of
the selected route data.

6. The navigation apparatus according to claim 3, wherein
said generation device comprises:
10 a required time computation device (123) which computes
required time required for the entire process according to
the route data; and
· · · · · a route generation device (123) which generates the
route data on the basis of the computed route data required
15 time.

7. The navigation apparatus according to claim 1, wherein,
in a case where said departure point data acquisition device
obtains as departure point data a departure date and time from
20 the departure point and the location of the departure point,
· · · · · said generation device comprises:

· · · · · a search device which searches routes to the destination
on the basis of the map data and the location data of the
destination, and outputs at least one route as a search result;
25 · · · · · a determination device (123) which determines whether
or not a visit can be made within the period of the available
date and time of the registered destination on the basis of

the obtained departure point data, the output search result, the stay length information at the destination and the available information of the destination; and
5 a data generation device (123) which generates the route data from the departure point to the destination on the basis of the result of the determination.

8. The navigation apparatus according to claim 7, further comprising said notification device, wherein, in a case where
10 said determination device determines that a visit to at least one destination cannot be made on the basis of the stay length information at the destination and the available time information of the destination,

15 said notification device notifies that the visit to at least one destination cannot be made.

9. The navigation apparatus according to claim 7, wherein
said determination device comprises:

20 an expected time computation device (123) which computes the expected arrival time and the expected departure time on the basis of the departure point data obtained by said departure point data acquisition device, the search results output from said search device and the stay length information at the destination obtained by said spot data acquisition
25 device; and

 an available time determination device (123) which determines whether or not the computed expected arrival time

and the computed expected departure time are contained in the available date and time indicated by the available time information of the destination.

5 10. The navigation apparatus according to claim 7, further comprising said notification device, wherein, in a case where said determination device determines that a visit to at least one destination cannot be made on the basis of the stay length information at the destination and the available time
10 information of the destination,

 said determination device comprises:

 a stay length determination device (123) which determines whether or not the destination to which a visit cannot be made can be made visitable by changing the stay length
15 indicated by the stay length information at the destination; and

 a stay length change computation device (123) which computes a change in stay length when it determines that the non-visitable destination can be visited if the stay length
20 is changed, and

 wherein said notification device notifies the computed change in stay length to be made.

11. The navigation apparatus according to claim 1, wherein
25 said spot data acquisition device obtains genre information indicating a genre of the registered destination and obtains the stay length information at the registered destination on

the basis of the obtained genre information.

12. The navigation apparatus according to claim 1, further comprising a time setting device (106, 108, 125) which sets
5 the stay length information in advance by associating the stay length information with the spot data,

wherein said spot data acquisition device obtains the set stay length information at the time of obtaining the spot data.

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13. The navigation apparatus according to claim 3, wherein, in a case where a plurality of route data are generated by said generation device,

said generation device comprises a priority
15 computation device (123) which computes a priority for each of the route data in relation to the others on the basis of the spot data on the registered destination, and

said notification device notifies one of each route data and the destination information in the route data on the
20 basis of the computed required times of the route data and the computed priorities for the route data.

14. The navigation apparatus according to claim 13, wherein, in a case where the spot data includes at least one of genre
25 information indicating a genre of the destination and weather information indicating whether or not a visit can be made according to weather of the destination,

..... said priority computation device computes the priority for each of the route data in relation to the others on the basis of the spot data on the registered destination.

5 15. The navigation apparatus according to claim 1, further comprising said notification device, wherein, in a case where the spot data includes at least one of genre information indicating a genre of the destination and weather information indicating whether or not a visit can be made according to
10 weather of the destination,

 said notification device notifies at least one of the genre information or the weather information on the destination registered by said registration device, when the route data is generated by said generation device.

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16. The navigation apparatus according to any one of claims 1 to 15, wherein, in a case where the route guidance is performed by said route guidance device on the basis of the generated route data,

20 said navigation apparatus comprises:

 a present position acquisition device (101, 102) which obtains present position data indicating a present position of the mobile unit while the route guidance is performed;

25 a predicted time computation device (124) which computes, during the route guidance, a predicted arrival time at which arrival at the registered destination will occur, on the basis of the obtained present position data of the mobile

. unit; and

a regeneration device which regenerates route data on a route from the obtained present position of the mobile unit to an unvisited destination set in the route data but not yet 5 visited, on the basis of the expected arrival time and the computed predicted arrival time, and

wherein said route guidance device performs route guidance on the basis of the regenerated route data.

10 17. The navigation apparatus according to claim 16, wherein said regeneration device comprises:

a time difference computation device (124) which computes the time difference between the expected arrival time and the computed predicted arrival time;

15 a regeneration determination device which determines whether or not a route to the unvisited destination set in the route data should be regenerated on the basis of the computed time difference; and

a route regeneration device (124) which performs 20 regeneration of the route data when said regeneration determination device determines that the route to the unvisited destination should be regenerated.

18. The navigation apparatus according to claim 16, wherein 25 said regeneration determination device comprises:

an addition/deletion determination device which determines, on the basis of the time difference computed by

· said time difference computation device, at least one of addition of a destination to be newly set as an intermediate destination and removal of a destination set in the route data; and

5 a decision device (124) which decides, on the basis of the result of the determination made by said addition/deletion determination device, whether or not a route to the unvisited destination set in the route data should be regenerated.

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19. The navigation apparatus according to claim 14, wherein, in a case where the spot data includes weather information, and route guidance is performed on the basis of the generated route data by said route guidance device,

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 said navigation apparatus comprises:

 a present position acquisition device (101, 102) which obtains present position data indicating a present position of the mobile unit while the route guidance is performed;

20 a weather information acquisition device which obtains weather forecast information on the destination set in the route data during the route guidance; and

 a regeneration device which regenerates route data on a route from the obtained present position of the mobile unit to an unvisited destination set in the route data but not yet visited, on the basis of the obtained weather forecast information on the destination and the weather information obtained by said spot data acquisition device, and

wherein said route guidance device performs the route guidance on the basis of the regenerated route data.

20. The navigation apparatus according to claim 19, wherein
5 said regeneration device comprises:

an addition/deletion determination device which determines, on the basis of the weather forecast information on the destination obtained by said weather information acquisition device and the weather information on the 10 destination obtained by said spot data acquisition device, at least one of addition of a destination to be newly set as an intermediate destination and removal of a destination set in the route data; and

15 a decision device (124) which decides, on the basis of the result of the determination made by said addition/deletion determination device, whether or not a route to the unvisited destination set in the route data should be regenerated.

20 21. The navigation apparatus according to claim 16, wherein, in a case where a plurality of the unvisited destinations exist when the route guidance device performs route guidance on the basis of the route data,

25 said regeneration device regenerates the route data on the route from the obtained present position of the mobile unit to the unvisited destination by rearranging the visit order of the unvisited destinations.

22. The navigation apparatus according to any one of claims 1 to 15, wherein, in a case where route guidance is performed on the basis of the generated route data by said route guidance device,

said navigation apparatus comprises:

a present position acquisition device (101, 102) which obtains present position data indicating a present position of the mobile unit while the route guidance is performed;

10 a travel time computation device (124) which, during the route guidance, computes a continuous travel time during which the mobile unit travels continuously;

15 a detection device (125) which detects that the computed continuous travel time of the mobile unit lapses away for a certain time period set in advance; and

20 a presentation device (109, 112) which presents the destination set in advance as a new destination when said detection device detects that the computed continuous travel time of the mobile unit lapses away for the time period set in advance,

wherein said route guidance device performs the route guidance on the basis of the route data generated by said generation device and the presented destination.

25 23. The navigation apparatus according to claim 22, further comprising an identification device which identifies a kind of a travel road on which the mobile unit travels on the basis

. of the present position of the mobile unit obtained by said present position data acquisition device and the map data stored in the storage device,

wherein said presentation device presents the
5 destination set in advance as a new destination on the basis of the kind of the travel road identified by said identification device and the fact that the detected continuous travel time of the mobile unit detected by said detection device lapses away for the time period set in advance.

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24. The navigation apparatus according to claim 16, further comprising said notification device, wherein,

said notification device notifies the route data is regenerated by said regeneration device.

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25. The navigation apparatus according to claim 24, further comprising a regeneration selection device (106, 108) which selects whether or not the route guidance should be performed based on the route data regenerated by said regeneration device,
20 when the regeneration of the route data is notified by said notification device,

wherein said route guidance device performs the route guidance on the basis of the regenerated route data when said regeneration selection device selects that the route guidance
25 is performed.

26. The navigation apparatus according to any one of claims

1 to 15, wherein, in a case where the route guidance is performed on the basis of the route data generated by said route guidance device, and where the destination information includes guide information of the destination,

5 said navigation apparatus further comprises:

 a present position acquisition device (101, 102) which obtains present position data indicating a present position of the mobile unit while the route guidance is performed;

10 a distance computation device (124) which computes a distance to the destination on the basis of the obtained present position of the mobile unit;

 a distance determination device (124) which determines whether or not the computed distance to the destination is within a distance range set in advance; and

15 a presentation device which presents the guide information when said distance determination device determines that the computed distance to the destination is within the distance range set in advance.

20 27. A navigation method characterized by said navigation method comprising:

 a departure point data acquisition process which obtains departure point data including at least location data of a departure point from which a mobile unit departs;

25 a registration process which registers a destination to be reached by the mobile unit;

 a spot data acquisition process which obtains spot data

on the registered destination including at least location data indicating the location of the destination, stay length information representing information on an expected stay length at the destination and available time information
5 indicating available dates and times of the destination;

a map data acquisition process which obtains map data stored in a storage device;

a generation process which generates route data from the departure point to the destination including at least an
10 expected arrival time at the destination on the basis of the obtained departure point data, the spot data on the registered destination and the map data; and

15 a route guidance process which performs route guidance from the departure point to the destination on the basis of the generated route data.

28. The navigation method according to claim 27, wherein said route guidance process includes:

a present position acquisition process which obtains
20 present position data indicating a present position of the mobile unit while the route guidance is performed;

a predicted time computation process which computes a predicted arrival time at which arrival at the registered destination will occur, on the basis of the obtained present
25 position data of the mobile unit; and

a regeneration process which regenerates route data on a route from the obtained present position of the mobile

unit to an unvisited destination set in the route data but not yet visited, on the basis of the expected arrival time and the computed predicted arrival time.

5 29. A route data generation program for generating route data relating to route guidance of a mobile unit by a computer, characterized by said route data generation program making the computer function as:

10 a departure point data acquisition device which obtains departure point data including at least location data of a departure point from which a mobile unit departs;

a registration device which registers a destination to be reached by the mobile unit;

15 a spot data acquisition device which obtains spot data on the registered destination including at least location data indicating the location of the destination, stay length information representing information on an expected stay length at the destination and available time information indicating available dates and times of the destination;

20 a map data acquisition device which obtains map data stored in a storage device;

25 a generation device which generates route data from the departure point to the destination including at least an expected arrival time at the destination on the basis of the obtained departure point data, the spot data on the registered destination and the map data; and

a route guidance device which performs route guidance

from the departure point to the destination on the basis of the generated route data.

30. The route data generation program according to claim 5 29, wherein, in a case where the route guidance is performed on the basis of the generated route data, said route data generation program makes the computer function as:

a present position acquisition device which obtains present position data indicating a present position of the 10 mobile unit while the route guidance is performed;

a predicted time computation device which computes a predicted arrival time at which arrival at the registered destination will occur, on the basis of the obtained present position data of the mobile unit; and

15 a regeneration device which regenerates route data on a route from the obtained present position of the mobile unit to an unvisited destination set in the route data but not yet visited, on the basis of the expected arrival time and the computed predicted arrival time.

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31. A recording medium on which the route data generation program according to claim 29 is recorded so as to be readable with a computer.

25 32. A server apparatus in a navigation system, characterized by said server apparatus comprising:

a reception device which receives departure point data

- including at least location data of a departure point of a mobile unit registered by a terminal device departs, and a destination which is to be reached by the mobile unit;
- 5 a spot data acquisition device which obtains spot data on the registered destination including at least location data indicating the location of the destination, stay length information representing information on an expected stay length at the destination and available time information indicating available dates and times of the destination;
- 10 a storage device which stores map data;
- a generation device which generates route data from the departure point to the destination including at least an expected arrival time at the destination on the basis of the obtained departure point data, the spot data on the registered 15 destination and the map data; and
- a route guidance control device which controls route guidance in said terminal device from the departure point to the destination on the basis of the generated route data.
- 20 33. The server apparatus in the navigation system according to claim 32, wherein, in a case where the route guidance of said terminal device is controlled by said route guidance control device on the basis of generated the route data , said server apparatus comprises:
- 25 a present position acquisition device which obtains present position data indicating a present position of the mobile unit while the route guidance is performed;

a predicted time computation device which computes, during the route guidance, a predicted arrival time at which arrival at the registered destination will occur, on the basis of the obtained present position data of the mobile unit; and

5 a regeneration device which regenerates route data on a route from the obtained present position of the mobile unit to an unvisited destination set in the route data but not yet visited, on the basis of the expected arrival time and the computed predicted arrival time,

10 wherein said route guidance control device controls the route guidance in said terminal device on the basis of the regenerated route data.

34. The navigation apparatus according to claim 1, wherein,
15 in a case where a plurality of destinations are registered by said registration device,

 said generation device comprises:

 a classification device (123) which classifies the plurality of the destinations into a first destination group
20 representing some of the destinations having positions in visit orders which should be first determined, and a second destination group representing the other destinations, on the basis of the stay length information and the available time information in the spot data;

25 a visit order setting device (123) which sets the positions in visit orders of the classified first destination group; and

a route data generation device (123) which generates route data on a route from the departure point to the destination including at least an expected arrival time at the destination, on the basis of the set positions in visit order of the first 5 destination group, the obtained departure point data, the registered spot data on the destination and the map data.

35. The navigation apparatus according to claim 34, wherein said classification device comprises:

10 a subtraction device (123) which subtracts the stay length indicated by the stay length information from the available time indicated by the available time information;

a comparison device (123) which compares the time obtained by said subtraction device with a value set in advance; 15 and

a destination group classification device (123) which performs classification into the first destination group and the second destination group on the basis of the comparison result by said comparison device.

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36. The navigation apparatus according to claim 34, wherein said route data generation device generates route data on a route from the departure point to the destination including at least an expected arrival time at the destination while 25 setting the positions in visit orders of the second destination group, on the basis of the available time information and the stay length information on the destinations and the set

positions in the visit orders of the first destination group.